

Abstract ca, co, ni,
so, p and cr.



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Abstract Welding is one of the fabrication process for the joining of one or more similar and dissimilar metals as a permanent joint with the application of heat and pressure. Welding should join the metal by heat the metal to its boiling point, due to melting of metal enormous amount of fumes should be evolved from this process. The welding fumes should contain hazardous metal contaminants such as Al, Mn, CO₂, Ca, CO, Ni, SO, P and Cr. Expose of these welding fumes should produce health effects and occupational diseases such as asthma, cancer, parkinson disease, neurotoxic effects, hemoptysis and pulmonary functions disorder. It include the airborne contaminant monitoring of toxic gases of weld bonding process on safety and health effects of welders. This study should presents the standards of exposure of welding fumes and the safe measures should be recommended.

Keywords: welding, welding fumes, occupational disease, health effects. 1.

0 Introduction Welding is a fabrication process to make high strength joint between two or more parts by heating to their melting temperature, with or without the application of pressure and with or without the use of filler metal. The filler metal has a melting point approximately same as the base metal. A filler material is typically added to the joint to form a pool of molten material that cools to form a joint that is usually stronger than the base material. Pressure may also be used in conjunction with heat, or by itself, to produce a weld. Welding also requires a form of shield to protect the filler metals or melted metals from being contaminated or oxidized.

There are different welding methods, including spot welding, metal inert gas (MIG), and tungsten inert gas, which are forms of gas metal arc welding, arc welding, and gas welding. Welding fumes are the airborne contaminants which are exhaled from the welding process. These exhaled fumes should be generated due to heating of the metal to its boiling point and melting of the metals. These fumes are complex mixture of metallic oxides, silicates, fluorides and metal vapours. The welding fumes contains fine particles of electrodes, coated flux, welding materials and the parent materials. Welding gases are produced by the decomposition of fluxes or from the interaction of ultraviolet light or high temperatures with gases or vapours in the air. 2.

0 Methods Air sampling Air sampling is the process of collecting samples of air in order to determine the concentration of contaminants in the air. It is used to determine the contaminants in the work area or the ambient air. The Occupational Safety and Health Administration (OSHA) requires monitoring to be done using personal samples. Area sampling may provide information on environmental exposure or background exposure. It should be expressed in mg/m³. Personal air sampling Personal air sampling is used to determine the specified worker's exposure.

This method personal air sampling device is fixed at the collar of the worker which specifies the breathing zone. The breathing zone is within 30cm radius of mouth and nose. Personal samples ensure as far as possible that the air sampled best represents the air inhaled by the worker. Spirometric test It is the most common of the pulmonary function tests (PFTs). It

measures lung function, specifically the amount) of air that can be inhaled and exhaled.

Spirometry is helpful in assessing breathing patterns that identify conditions such as asthma, pulmonary fibrosis, cystic fibrosis, and COPD. It is also helpful as part of a system of health surveillance, in which breathing patterns are measured over time. to diagnose or manage asthma. To detect respiratory disease in patients presenting with symptoms of breathlessness, and to distinguish respiratory from cardiac disease as the cause.

- To measure bronchial responsiveness in patients suspected of having asthma.
- To diagnose and differentiate between obstructive lung disease and restrictive lung disease. 3.

0 Standards

- Ceiling limit The exposure limit a worker's exposure may never exceed.
- Sampling and analytical error A statistical estimate of the uncertainty associated with a given exposure measurement.
- Short-term exposure limit (STEL) The average exposure to a contaminant to which a worker may be exposed during a short time period (typically 15 - 30 minutes).
- Time-weighted average (TWA) The average exposure to a contaminant over a given period of time, typically 8-hours.
- Permissible exposure limit (PEL) They are developed by the OSHA and are legally enforceable. PELs are 8-hour, time-weighted averages of airborne exposure.

Threshold limit value (TLV), It is the guidelines developed by the American Conference of Governmental Industrial Hygienists (ACGIH) and are published annually by that organization. Like PELs, TLVs are also 8-hour,

time-weighted averages. Exposure limit: The ACGIH has set an 8-hour TWA of 5 mg/m³ for these welding fumes, measured as total particulate in the welder's breathing zone. OSHA proposed an 8-hour TWA of 5 mg/m³ for these fumes; this limit is established in the final rule. (NOTE: This limit applies to the total fume concentration generated during the welding of iron, mild steel, or aluminum; the fumes generated by the welding of stainless steel, cadmium, or lead-coated steel, or other metals such as copper, nickel, or chrome) Ø The occupational exposure limit recommended by NIOSH REL is 1 mg/m³ (TWA) and 3 mg/m³ (STEEL). Ø The occupational exposure limit recommended by NIOSH IDLH is 500 mg/m³. Ø The occupational exposure limit recommended by OSHA PEL is 5 mg/m³ (ceiling) Ø The occupational exposure limit recommended by ACGIH TLV is 0.

0.2 mg/m³ (TWA). 4.0 Conclusion This study should notify many hazardous agents that could be exhaled from the welding process. Those fumes had the contaminants of magnesium, manganese, chromium, copper, zinc, lead and other metal oxides and metal fluorides.

It shows that the exposure to these fumes should be tends to acute and chronic diseases such as different types of cancer and other pulmonary diseases. The welders should have associate with reduction in health and affects QOL. This could be minimize by manufacturing nano particles types of electrodes. The welding process could be handled in well ventilated area, if space is confined use respirators. Welders should use personal protective equipments such as nose mask, safety goggles with proper shade number

and local exhaust ventilation should be provided to remove the fumes and gases in the welding area.